

WHAT IS CLAIMED IS:

Sub A 1. A method of adjusting the brightness of an image, the method wherein image data are acquired by an image acquisition device, in said data a pixel value of each pixel is expressed as a set of three mutually independent components and the brightness of each pixel being defined based on said three components,

5 said method comprising a step of making a rate of pixels having the maximum brightness in said the definition to all pixels a predetermined rate by making an adjustment to said image acquisition device and/or said pixel value.

Sub C 2. The method as set forth in claim 1, wherein said image acquisition device is a digital camera and the adjustment to said image acquisition device is an adjustment to an exposure value at the time of photographing by said digital camera.

3. The method as set forth in claim 2, wherein said pixel value is a value expressed in terms of a linear scale or power scale and wherein the adjustment to said exposure value is made based on the following transformation Eq. (1):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = k \begin{pmatrix} R \\ G \\ B \end{pmatrix} \dots (1)$$

20 where R', G', and B' are the three components after a transformation; R, G, and B are the three components before

a transformation; and k is a constant determined according to said rate.

4. The method as set forth in claim 2, wherein said pixel value is a value expressed in terms of a logarithmic scale and the adjustment to said exposure value is made based on the following transformation Eq. (2):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = \begin{pmatrix} R \\ G \\ B \end{pmatrix} + \begin{pmatrix} k \\ k \\ k \end{pmatrix} \dots (2)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

5. The method as set forth in claim 1, wherein said image acquisition device is a data acquisition device for acquiring an image as digital data and the adjustment to said pixel value is a data transformation process of transforming the acquired digital data.

6. The method as set forth in claim 5, wherein said pixel value is a value expressed in terms of a linear scale or power scale and said data transformation process is a process based on

the following transformation Eq. (1):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = k \begin{pmatrix} R \\ G \\ B \end{pmatrix} \dots (1)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

5 7. The method as set forth in claim 5, wherein said pixel value is a value expressed in terms of a logarithmic scale and said data transformation process is a process based on the following transformation Eq. (2):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = \begin{pmatrix} R \\ G \\ B \end{pmatrix} + \begin{pmatrix} k \\ k \\ k \end{pmatrix} \dots (2)$$

10 where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

9
a 8. The method as set forth in ^{claim 1} ~~any one of claims 1 through 7~~, wherein said brightness is defined by the
15 following Eq. (3):

$$L = \max(R, G, B)$$

--- (3)

where L is the brightness of a pixel; R, G, and B are the three components; and $\max(x, y, z)$ is the maximum value among x, y, and z.

9. A digital camera comprising:

image pick-up means for photographing an image and acquiring image data in which a pixel value of each pixel is expressed as a set of three mutually independent components;

brightness analyzing means for computing a histogram of the brightness of said pixel defined based on said three components for said image data acquired by said image pick-up means; and

exposure control means for making an adjustment to an exposure value at the time of photographing on the basis of said histogram so that a rate of pixels having the maximum brightness in the definition to all pixels becomes a predetermined rate.

10. The digital camera as set forth in claim 9, wherein said pixel value is a value expressed in terms of a linear scale or power scale and the adjustment to said exposure value is made based on the following transformation Eq. (1):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = k \begin{pmatrix} R \\ G \\ B \end{pmatrix} \dots (1)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

5 11. The digital camera as set forth in claim 9, wherein said pixel value is a value expressed in terms of a logarithmic scale and the adjustment to said exposure value is made based on the following transformation Eq. (2):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = \begin{pmatrix} R \\ G \\ B \end{pmatrix} + \begin{pmatrix} k \\ k \\ k \end{pmatrix} \dots (2)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

12. The digital camera as set forth in ^{Claim 9} ~~any one of claims 9 through 11~~, wherein said brightness is defined by the following Eq. (3):

$$L = \max(R, G, B) \quad \text{--- (3)}$$

where L is the brightness of a pixel; R, G, and B are the three components; and max(x, y, z) is the maximum value among x, y, and z.

13. An image processor comprising:

data acquisition means for acquiring an image as digital data in which a pixel value of each pixel is expressed as a set of three mutually independent components;

brightness analyzing means for computing a histogram of the brightness of said pixel defined based on said three components for said digital data acquired by said data acquisition means; and

data transformation means for performing a data transformation process on the acquired digital data on the basis of said histogram so that a rate of pixels having the maximum brightness in the definition to all pixels is made a predetermined rate.

14. The image processor as set forth in claim 13, wherein said pixel value is a value expressed in terms of a linear scale or power scale and said data transformation process is a process based on the following transformation Eq. (1):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = k \begin{pmatrix} R \\ G \\ B \end{pmatrix} \dots (1)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before

a transformation; and k is a constant determined according to said rate.

15. The image processor as set forth in claim 13, wherein said pixel value is a value expressed in terms of a logarithmic scale and said data transformation process is a process based on the following transformation Eq. (2):

$$\begin{pmatrix} R' \\ G' \\ B' \end{pmatrix} = \begin{pmatrix} R \\ G \\ B \end{pmatrix} + \begin{pmatrix} k \\ k \\ k \end{pmatrix} \dots (2)$$

where R', G', and B' are the three components after a transformation; R, G, and B are the three components before a transformation; and k is a constant determined according to said rate.

16. The image processor as set forth in ^{claim 13} ~~any one~~ of ~~claims 13 through 15~~, wherein said brightness is defined by the following Eq. (3):

$$L = \max(R, G, B) \quad \text{--- (3)}$$

where L is the brightness of a pixel; R, G, and B are the three components; and max(x, y, z) is the maximum value among x, y, and z.